Feb. 16, 1960 J. A. CASH, SR 2,924,925

MATTRESS FILLING MACHINE

Filed May 29, 1956 4 Sheets-Sheet 1

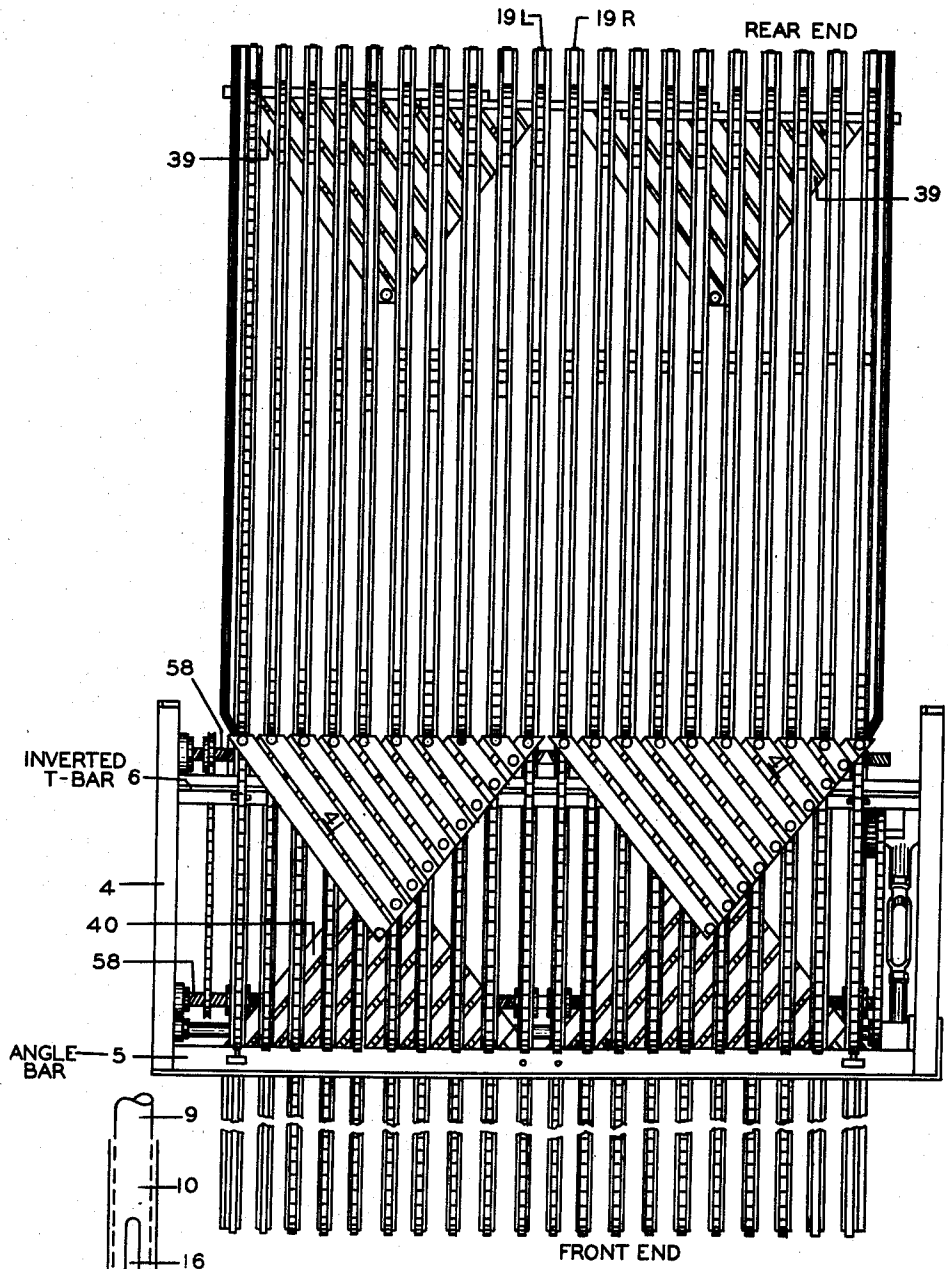

FIG. 1

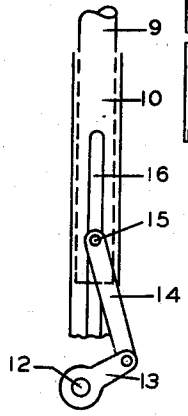

FIG. 5

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MATTRESS FILLING MACHINE

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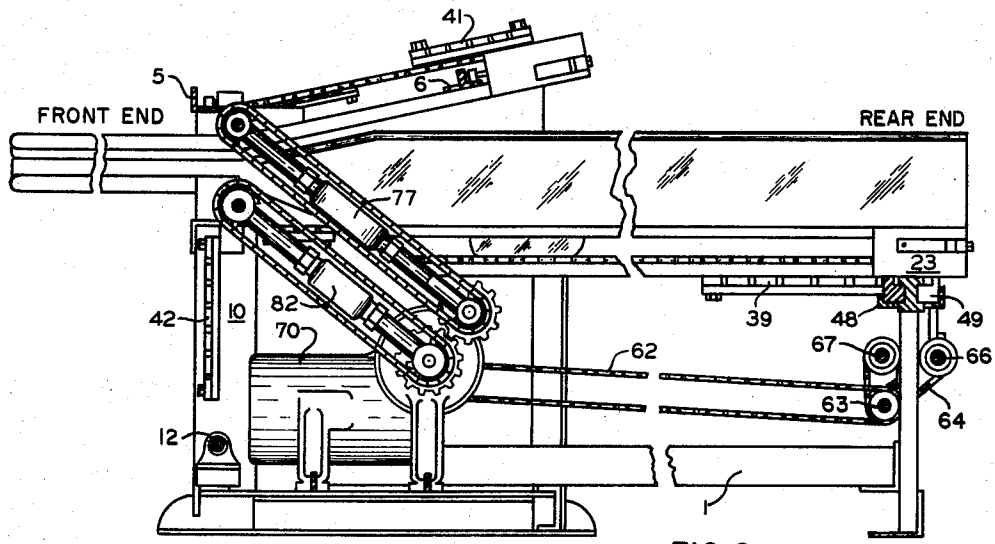

FIG. 2

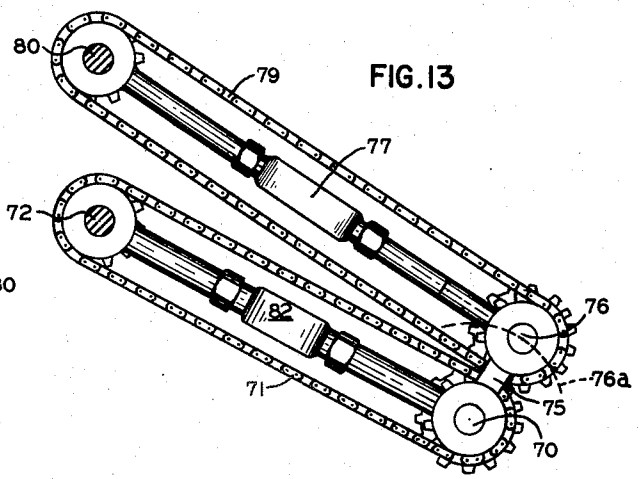

FIG. 13

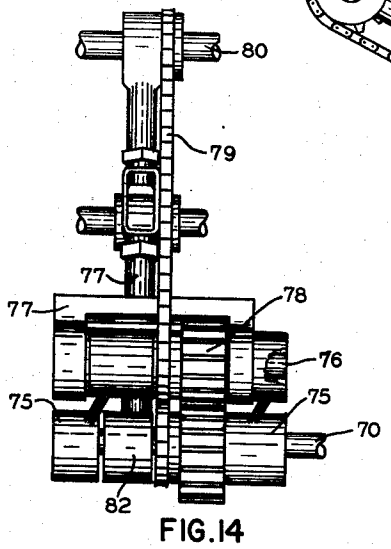

FIG. 14

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MATTRESS FILLING MACHINE

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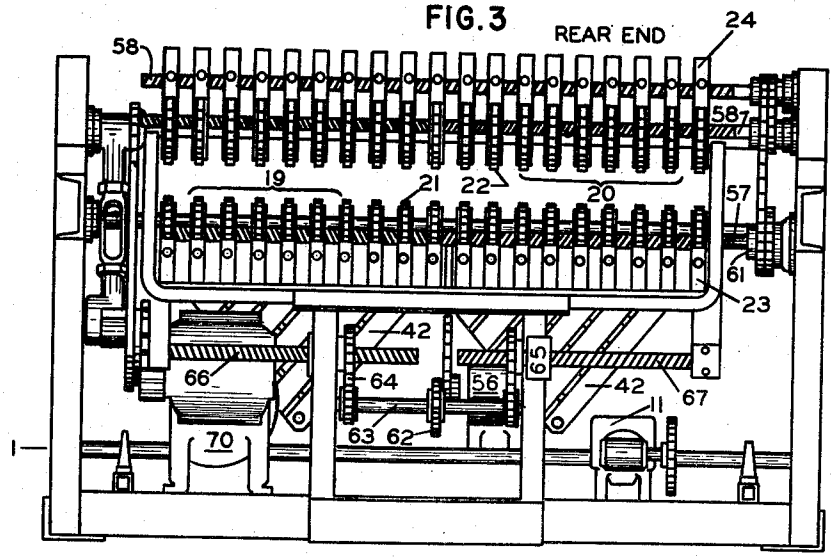
FIG. 3



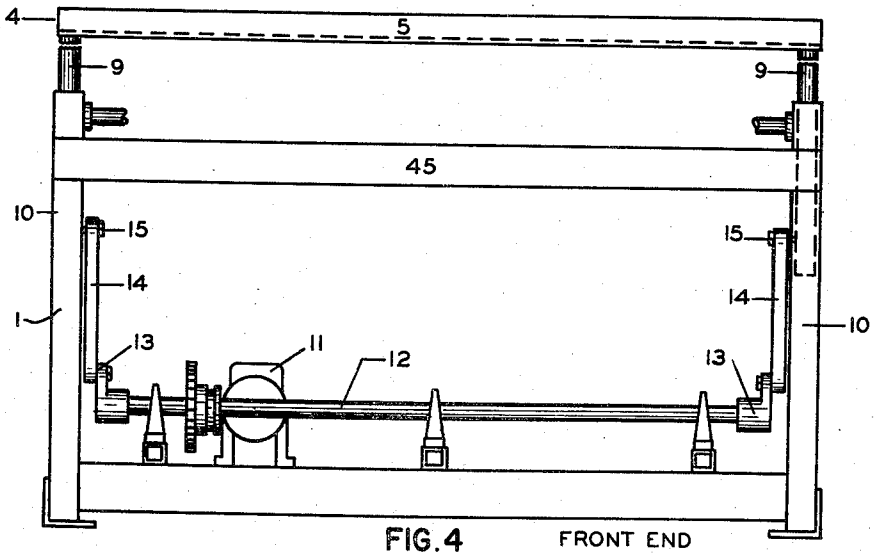


FIG. 4 FRONT END

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MATTRESS FILLING MACHINE

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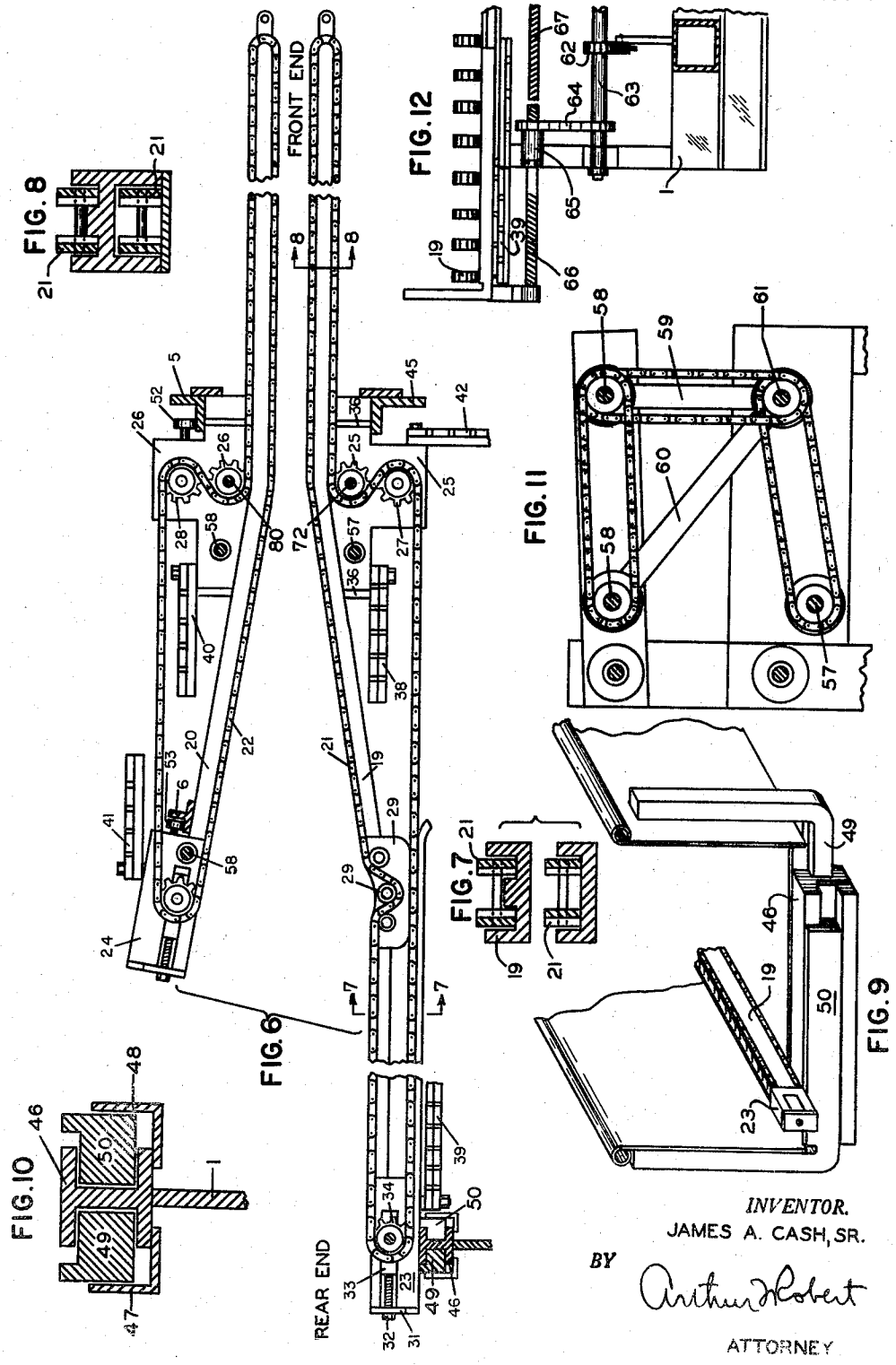

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Patented Feb. 16, 1960

2,924,925

MATTRESS FILLING MACHINE

James A. Cash, Sr., Louisville, Ky., assignor to Cash Machine Company, Inc., Louisville, Ky., a corporation of Kentucky

Application May 29, 1956, Serial No. 588,162

23 Claims. (Cl. 53—125)

This invention relates to a mattress filling machine of the type designed to convey mattress filling material forwardly from a receiving section at its rear end through an intermediate compressing section into a spout section at its front end where it delivers the material in a compressed condition into the interior of a mattress casing which is telescopically slipped over the spout section.

As presently constructed, machines of this type include: (1) a pair of upper and lower horizontally-extending vertically-spaced frames; (2) means for adjusting the vertical spacing between these frames over a given range of mattress thicknesses; (3) three groups of parallel bar-chain assemblies including one lower group of straight and one pair of lower and upper groups of crooked or dog-leg bar chain assemblies, each assembly being composed of one elongate bar and several conveyor chains mounted thereon for longitudinal conveying movement along the inner side of the bar and return movement on its outer side with sprockets mounted on both ends of the straight bars and on the rear end of the dog-leg bars; (4) three pairs of longitudinally-spaced transversely-extending lazytong equispacers, one pair for each group of bar-chain assemblies, each pair holding the bars of its group in parallel relationship and interconnecting or interlinking them together to form a longitudinally-extending transversely expansible and retractable conveyor unit; (5) means mounting the straight bar conveyor unit on the lower frame to provide the receiving section and the lower and upper dog-leg bar conveyor units on their respective lower and upper frames to provide the compressing and spout sections thereof, the mounting means including, in each unit, means for anchoring the two center bars fixedly to, and the other bars slidably upon, the corresponding frame; (6) means on each frame for moving the slidable bars adjustably to widen and narrow each conveyor unit over a given range of mattress widths; and (7) means for driving all three conveyor units simultaneously.

Heretofore, the vertical spacing mechanism included four vertical screws located at the four corners of the compressing section and suitably connected to each other for simultaneous operation when one screw was turned. This arrangement is cumbersome, expensive to make and relatively slow to operate. Furthermore, it has always been manually driven apparently because of the additional complications involved in motorizing it.

Among the important objects of the invention are: to make the vertical adjustment mechanism simpler, cheaper and easier to install and operate; to make it reversible and operative in either direction to effect either an increase or decrease in the vertical spacing; and to make it foolproof so that it cannot be jammed or otherwise readily injured by even the most careless operator.

Heretofore, the bar-chain assemblies have been unsatisfactory from a chain tensioning standpoint and objectionable otherwise particularly for providing an unduly complicated driving arrangement.

Another important object is to provide each bar assembly with one conveniently located fixed sprocket for driving purposes and a simple, effective, chain tensioning means involving the use of another conveniently located openly accessible sprocket and to simplify the design of these assemblies in a manner enabling one lower and upper pair of assemblies to be interconnected into lower and upper conveying units respectively providing the three lower sections and the two upper sections.

Another important object is to simplify the mounting for and the arrangement of each individual conveyor chain in a manner permitting the use of a simple, relatively inexpensive and highly effective means of driving each chain, holding it to a given contour and individually adjusting the tension of each chain.

While present day machines use four lazytong equispacers on the lower pair of conveyors, two spacers for each conveyor, the bars of the assemblies are nevertheless somewhat unstable in operation.

Another important object of the present invention is to reduce the total number of conveyor equispacers on the lower frame and increase the stability of the conveyor assembly bar.

Heretofore, the width adjusting mechanism for the lower conveyor utilized a horizontal screw mounted at the rear end of the machine on the underside of the receiving section where the overall width of the machine varies with each width adjustment. This screw was anchored at its middle to the frame and threaded at each outer end to the outermost bar so as to leave these outer end portions projecting horizontally outward from the sides of the machine at all widths smaller than full width. These projections provided knee-high obstructions which interfere with the travel of workers around the rear corners of the machine and constitute a constant source of annoyance and injury.

Another important object of the present invention is to eliminate such projections with their attendant difficulties and to provide a simple and effective width adjusting means in its place at the rear end of the machine.

The lower conveyor usually has heretofore been driven by a chain connecting a motor drive shaft sprocket with a conveyor drive sprocket. In use, this chain has been subject to repeated breakage even when designed heavy enough to carry its apparent share of the load.

I have discovered that this chain breakage has been due to the improper transmission of the load; hence, a further object is to insure the proper load transmission and thereby correspondingly reduce chain breakage.

In order to use a single power source on the lower frame for driving both the lower and upper conveyors, it is necessary to provide an adjustable driving connection between the lower drive and the upper conveyors which will accommodate the vertical adjustment therebetween.

Another important object of the present invention is to provide, between the lower driving means and the upper conveyor, a simple self-adjusting driving arrangement, which automatically accommodates the relative movement involved in adjusting the vertical spacing between the upper and lower units.

In accomplishing the foregoing objectives, I improve the vertical spacing adjustment means by providing the upper frame with a pair of vertical legs depending downwardly into snug slidable telescopic engagement with a pair of fixed hollow uprights rigidly mounted on the lower frame and by connecting each leg to a motorized crank arm which, regardless of the direction in which it is driven, reciprocates the depending legs to raise and

lower the upper assembly in a slow and foolproof manner.

The manner in which the bar assemblies are constructed may be very measurably simplified in accordance with my invention with a corresponding simplification of the conveyor structures as a whole, by doing the following: extending each lower and upper bar respectively through all of the lower and upper sections; providing each bar with a single chain extending throughout its full length; mounting chain tensioning means at the rear end of each lower and upper assembly which not only facilitates the use of simple tensioning means but locates such means in an openly accessible position; providing a drive sprocket along the outer side of each bar, preferably at the outer obtuse angle formed by the adjacent ends of the compressing and spout sections; and providing each lower bar, at the outer side of each inner obtuse angle, with means for holding the inner conveying run of the chain closely adjacent to the inner side of the bar. This results in a simpler bar assembly arrangement than has heretofore been provided, enables each chain to be easily and quickly adjusted without affecting the position of the drive means and enables the chain drive sprocket to be mounted in a fixed position on the bar.

The rigidity or stability of the bars of the lower conveyor is very substantially increased by interconnecting those bars with an extra equispacer positioned to extend in a transverse plane which lies at a substantial angle to the transverse plane of at least one or both of the other equispacers on the same conveyor.

The width adjusting mechanism in my machine is improved by the following: dividing the horizontal adjusting screw, at the rear end of the machine, into separate right and left hand sections; connecting the outer end of each section of that screw rigidly to an adjacent slidable bar for inward and outward movement therewith; internally threading a rotatable member to each adjusting screw section; and holding this rotatable member against transverse movement while rotating it in one direction or the other so as to cause it to pull or push the screw section transversely.

For the lower conveyor drive, I connect the lower conveyor drive shaft and a motorized drive shaft on the lower frame through appropriate sprockets and interconnecting chains. For the upper conveyor drive, which embodies a particular feature of my invention, I do the following: (*a*) connect the upper conveyor drive shaft and the lower motorized shaft through (and to the opposite ends of) a crooked elbow linkage, the floating pivot of which moves rotationally about the motorized shaft in one direction or the other to accommodate vertical adjustment in one direction or the other; (*b*) gear the motorized drive shaft to that pivot; and (*c*) provide a sprocket chain connection between that pivot and the upper conveyor drive shaft.

With this arrangement, as the upper frame rises during an adjustment, the elbow linkage straightens out, moving the floating pivot bodily upward in a circular path around the axis of the motorized shaft thus accommodating the vertical adjustment while maintaining the gear connection between the motorized shaft and the pivot and the sprocket chain connection between the pivot and the conveyor.

I discovered that, after the upper drive arrangement was provided with the elbow linkage, the breakage frequency of that chain was substantially reduced. Apparently, heretofore, the heavy load imposed upon these drive chains flexed their respective terminal (drive and driven) shafts inwardly toward each other. This caused the links on one side of the "going" run of the chain to tighten and those on the opposite side of the same run to slacken and correspondingly shifted the load from the slackened side to the tightened run overloading and ultimately breaking the latter. The upper elbow link now prevents the aforesaid terminal shafts from

flexing toward each other under heavy load conditions and thereby maintains both sides of the "going" run in a uniform load sharing condition. Consequently, in further accordance with my invention, the lower drive arrangement is similarly provided with a link rigidly spacing one terminal shaft from the other.

An embodiment of this invention is illustrated in the accompanying drawings, wherein:

Fig. 1 is a top plan view thereof;

Fig. 2 is an elevational view of the right side of the machine as it appears in Fig. 1;

Fig. 3 is an end elevational view of the right or rear end of the machine as it appears in Fig. 2;

Fig. 4 is a front end elevational view of the machine omitting all parts except the frame and the mechanism for adjusting the vertical spacing thereof;

Fig. 5 is a detail of the vertical spacing adjusting mechanism shown in Fig. 4;

Fig. 6 is a side elevational view of a lower and an upper bar assembly, omitting the face plate on each of the parts **23—26**;

Figs. 7 and 8 are sections along line **7—7** and **8—8** of Fig. 6;

Fig. 9 is a somewhat schematic perspective of the rear end support for the lower conveyor unit;

Fig. 10 is a detail of the rear end support for the lower conveyor unit;

Fig. 11 is a detail of the width adjusting mechanism at the compression section;

Fig. 12 is a detail of the width adjusting mechanism at the rear end of the receiving section;

Fig. 13 is a side elevational view of the sprocket chain drive arrangements for both conveyors; and

Fig. 14 is a view of the right side of that same arrangement as it appears in Fig. 13.

MACHINE ELEMENTS GENERALLY

The illustrated embodiment of my improved mattress filling machine, which has a compressing section of full fixed overall width and rear receiving and front spout sections of transversely expansible-retractable width, comprises: (1) lower and upper frames; (2) means for adjusting the vertical spacing between frames; (3) lower and upper bar assemblies; (4) lazytong equispacers interconnecting the lower and upper bar assemblies respectively into lower and upper conveyor units; (5) means mounting the lower and upper conveyors on the lower and upper frames; (6) means for adjusting the conveyor widths; and (7) means for driving the conveyors.

LOWER AND UPPER FRAMES

The lower frame, generally designated by the numeral **1**, comprises a horizontally directed open framework extending longitudinally through the receiving and compressing sections and transversely across the full width of the machine only in the compressing section. At its widest point along the receiving section, which is at the rear end thereof, it extends transversely across no more than the retracted width of the machine. This frame consists of any suitable number of upright frame members connected together longitudinally and transversely by suitable horizontal frame members most of which are also designated by the numeral **1**.

The upper frame **4** extends longitudinally through the compressing sections only and transversely across its full width. It comprises a pair of longitudinally-extending outwardly open side channels also designated **4** and a pair of front and rear cross bars **5** and **6**, the front bar **5** being in the form of an angle iron and the rear bar **6** in the form of an inverted T-bar.

VERTICAL ADJUSTMENT OF UPPER FRAME

The upper frame **4** is adjustably mounted on the lower frame **1** for relative vertical movement to permit the spacing between these frames to be adjusted over a de-

sired range of mattress thicknesses. This usually involves a range of 4 to 6 inches more or less. To this end: the upper frame **4** is provided at its front corners where its side members join its cross member **5**, with vertically depending legs **9**, one at each front corner, while the lower frame is correspondingly provided with a pair of rigid hollow guides or uprights **10**, one for each leg **9**. The legs **9** depend downwardly into snug telescopically-slidable engagement with the uprights **10** over a vertical distance sufficient to accommodate the maximum vertical adjusting movement.

While any suitable manually-operated means may be employed to slide the legs **9** upwardly and downwardly within uprights **10**, a motorized means is preferred; hence, illustrated. This means comprises: a reversible motor **11**, mounted on the lower frame and connected to rotate a transverse shaft **12** in either direction. Each end of the shaft **12** carries a crank arm **13**, the outer end of which is connected through a link **14** and pin **15** to a leg **9**. The pin **15** is suitably anchored on leg **9** of the upper frame to extend outwardly therefrom through a suitable slot **16** in the upright posts **10**.

Obviously, during each full rotation of the shaft in either direction, the links **14**, legs **10** and upper frame **4** will be vertically reciprocated one full cycle. Of course, this drive arrangement will be geared down to rotate this shaft at a speed slow enough (approx. 3 to 4 r.p.m.) to permit any desired degree of spacing to be obtained easily and accurately.

LOWER AND UPPER BAR ASSEMBLIES

Each lower (and upper) bar assembly includes: a bar **19** (and **20**); a chain **21** (and **22**); a chain tensioning means **23** (and **24**); a drive sprocket **25** (and **26**); and an idler sprocket **27** (and **28**). Each lower bar assembly additionally includes chain restraining or holding means **29**.

Bars

Each lower bar **19** extends continuously from the rear end of the machine successively through the horizontally-extending receiving section, the upwardly sloping compressing section and the horizontally extending spout section to the front end of the machine. Its upwardly sloping compressing section cooperates with its horizontal receiving section to form an inner obtuse angle and with its horizontal spout section to form an outer obtuse angle. Each upper bar **20** is identical to the lower bar except that the upper bar omits the receiving section and is relatively inverted so that its compressing section slopes forwardly downward.

Chains

A single chain **21** is mounted on each lower bar to encircle that bar lengthwise and provide an inner conveying run and an outer return run. Each upper bar similarly carries its chain **22**, which is identical to the chain **21** except that it too is correspondingly shorter due to the omission of the receiving section.

Chain tensioning means

Each of the lower chain tensioning means **23** is located at the rear end of its lower bar **19**. It comprises: a pair of transversely-spaced plates, also designated **23**, welded to the rear end of its bar **19**; a spacer block **31** interposed between the rear ends of the plates **23** and welded to them to space them apart; an adjusting screw **32** threaded to the spacer block **31**; an adjustable block **33** slidably mounted on the plates **23** for forward and rearward movement and connected to the adjusting screw **32** for adjustment thereby; and a sprocket **34** rotationally mounted on the slide block **33** to receive the rear end of the corresponding lower chain **21**.

Each of the upper chain tensioning means **24** has the same identical structure as the lower chain tensioning means **23** and is also located at the rear end of its upper bar **20**. Of course, it will be understood that the lower chain tensioning means **23** lies at the rear end of the lower receiving section while the upper tensioning means **24** lies at the rear end of the upper compressing section. It will also be appreciated that both the upper and lower tensioning means are of simple structure, easy to operate and are openly accessible for inspection and other purposes at all times.

Chain drive and idler sprockets

The lower and upper drive sprockets **24**, **26** and their associated idler sprockets **27**, **28** may, in accordance with my invention, be located at any convenient point along the outer side of their respective bars **19**, **20**. Preferably, each pair of sprockets, drive and idler, is located adjacent the apex of the outer obtuse angle of its bar. The mounting means for each lower pair **25**, **27**, comprises: a pair of transversely-spaced plates, also designated **25**, one plate welded to the under or outer side of its bar **19** and the other screwed or otherwise detachably secured to the one plate; a pair of blocks **36** interposed between the rear and front ends of the plates **25** to space them apart sufficiently to accommodate the interposed drive sprocket **25**; a pair of transversely-spaced and aligned openings in the plates **25** designed to receive the drive shaft for the drive sprockets; and a pair of smaller transversely-aligned openings, in the plates **25** below the drive sprocket openings, to receive a pin, stud or other suitable mounting means for the idler sprocket which is also positioned between plates **25**.

The drive and idler sprocket **26**, **28** for each upper bar are similarly mounted and the transversely-spaced plates used in the upper mounting are therefore designated **26**.

Chain holding means

It will be appreciated that, when a load is placed on the lower chain **21**, its dog-leg portions, which extend over the horizontally-extending receiving section and the upwardly sloping compressing section, will tend to straighten out and thus leave both sections. To restrain the chain and hold it to its receiving and compressing sections, the lower bar **19** is slotted at the apex of its inner obtuse angle and a loop of the chain **21** is trained to extend through this slot and around a holding member **29** in the form of a roller **29**, which is mounted on the outside of the bar at or adjacent to the apex of this inner obtuse angle. The roller **29**, actually, is positioned between and rotationally mounted upon a pair of transversely-spaced plates which are welded to the outer side of the bar. These plates are also designated by the numeral **29**. To reduce friction, additional rollers may be provided on each side of the roller **29** to support the chain at the points where it leaves the receiving section and where it enters the compressing section.

LAZY TONG EQUISPACERS

In accordance with conventional practice, each group of lower and upper bars **19**, **20** is to be expanded from its longitudinal center transversely outward in opposite directions; hence, the lower group **19** is provided on each side of center with one pair of equispacers **38**, **39** (see Fig. 6) to interconnect the lower bars on that side into a conveyor unit forming one-half of the lower conveyor while the upper group is similarly provided with two pairs of equispacers **40**, **41**, one on each side of center. This conventional practice is not entirely satisfactory because the lower assembly, which carries a considerable load, appears to be somewhat unstable. I have found, however, that its stability can be very measurably increased by providing it with an extra equispacer designated **42**. This equispacer **42** preferably lies in a (vertical) transverse plane extending at 90° to the (horizontal) transverse plane of the equispacers **38**, **39**.

CONVEYOR MOUNTING MEANS

Lower conveyor support

The lower conveyor, composed of its left and right sections, is mounted on the frame with its two center bars 19L and 19R (see Fig. 1), the inner marginal bars of its left and right sections, welded to the lower frame and thus rigidly secured thereto, and with its remaining bars slidably mounted upon the frame. For example, the front ends of the slidably mounted bars 19 of both lower sections simply rest gravitationally upon a lower frame cross member 45 which is located adjacent the front end of the compressing section.

The rear end support for the slidable bars 19 comprises: an I-beam 46 extending transversely across the retracted width of the machine; a pair of frame members 47 and 48 extending transversely along the front and rear sides of the I-beam and cooperating with it to provide a pair of open-ended cross channels which are also designated by the numerals 47 and 48. The cross channel 47 slidably supports a slide member 49 which extends transversely from its channel 47 outward on one side to the outermost assembly bar 19 on that side to which it is connected for retraction and expansion therewith. The bars 19 intermediate the center and outermost bars of that one section are slidably supported by slide bar 49. The other cross channel 48 similarly carries a slide bar 50 for the other section.

Upper conveyor support

The upper conveyor is simply suspended from the upper frame by welding its center bars thereto and by providing each of its other right and left section bars 20 with front and rear rollers 52, 53, which rest on the front and rear frame members in the form of angle iron 5 and inverted T-shape bar 6.

CONVEYOR WIDTH ADJUSTING MECHANISM

To adjust the width of the conveyor, a drive motor 56 is connected with one lower and two upper width adjusting screws at the compressing section and with lower screw width adjusting means at the rear end of the receiving section.

The three transverse adjusting screws, which are located at the compressing section, comprise: a lower screw 57 extending across the front end of the compressing section and providing a right hand thread for the outermost lower bar 19 on one side of center and a left hand thread for the outermost lower bar 19 on the other side of center; and a pair of upper screws 58 similarly extending across the front and rear ends of the compressing section and similarly providing right and left hand threads for the outermost bars on each side of center. The upper screws 58 are conventionally sprocket-chain connected to each other for simultaneous operation.

One of the upper screws 58 is also connected to and driven from the lower screw 56. This driving connection, which must accommodate vertical movement between frames, includes: a V-shaped linkage 59 depending from the upper screws 58 and including a vertical link, also designated 59, and an upwardly slanted link 60 pivoted together at their lower ends through floating pivot 61; one sprocket and chain connection between the lower screw 57 and the pivot 61 of the V linkage 59; and another sprocket and chain connection between that pivot (61) and one of the upper screws 58. It will be understood that pivot 61 moves vertically during each vertical adjustment, this movement being accommodated by the slack in the chain connecting screw 57 to pivot 61.

To adjust the width of the lower conveyor at the rear end of the receiving section, the drive motor 56 is connected through a rearwardly extending chain 62 to a cross shaft 63 rotationally mounted near the rear end of the machine. The cross shaft 63 is connected by chain 64 to the drive sprocket of a rotatable structure which

is mounted for rotation inside of a housing 65 that is rigidly secured to the frame. The rotary structure, within stationary housing 65, is internally threaded to a transverse screw 66 which extends through housing 64 to one outer margin of the machine and has its outer end rigidly and non-rotatably connected to the outermost bar 19 on that side of center. The housing 65 holds the rotary structure within it against transverse movement so that, when that structure is rotated, it will pull or push the screw transversely. The cross shaft 63 is similarly connected to another screw 67 to the outermost bar on the other side of center.

With this arrangement, the operation of the driving motor 56 will cause all transverse adjusting screws to operate simultaneously. At the compressing section, the connection of the screws and bars is such that the bars 19, 20 move relatively to the screws. At the rear end of the receiving section, the connection is such that the screws move with the outermost bars since the internally-threaded rotating structure within housing 65 will pull screws 66 and 67 inwardly or push them outwardly, as the case may be. This mechanism, therefore, has the advantage of avoiding the creation of obstructions at the rear corners of the machine which, heretofore, have constituted a constant source of annoyance and injury.

CONVEYOR DRIVE MEANS

The lower conveyor is conventionally driven through a drive motor 70, providing a motorized shaft also designated 70, and a sprocket and chain connection 71 between that shaft 70 and the lower conveyor drive shaft 72, which carries all of the lower drive sprockets 25, including the relatively fixed center sprockets 25 and the transversely movable sprockets 25 on each side of center, and which rotationally drives these sprockets and their respective chains 21.

To drive the upper conveyor, in accordance with my invention, it is necessary to do the following: provide a crooked elbow linkage 75 having a lower link, also designated 75, an upper link 77, and a pivot 76 connecting one end of the lower link to one end of the upper link 77; connect the lower motorized shaft 70 through said elbow linkage 75 to the upper conveyor drive shaft 80 so that the floating pivot 76 of the linkage 75 moves linearly in a circular path 76a about the motorized shaft 70 in one direction and the other as the upper conveyor drive shaft 80 is raised and lowered relatively thereto; gear the motorized shaft 70, through a pair of intermeshing gears 78 to the elbow linkage pivot 76 to rotate that pivot; and connect the rotating pivot 76 through a sprocket chain connection 79 to the upper conveyor drive shaft 80 to drive the upper conveyor.

With this arrangement, as the upper frame is raised, it will correspondingly raise the upper link 77, rotate the lower elbow link 75 and the pivot 76 about the fixed axis of motorized shaft 70 and thus raise the pivot to the same extent as the upper frame is raised. At the same time, it will maintain the gear and chain driving connections 78, 79 which, respectively, cause the motorized shaft 70 to drive the pivot 76 and the pivot 76 to drive the upper conveyor shaft 80. In this way, both upper and lower conveyors are driven from the same motor. This is desirable since it makes it easy to insure that both conveyors will always move at identical speeds.

It will be observed that the upper link 77 of the elbow linkage 75 provides a radius rod connection between pivot shaft 76 and upper conveyor drive shaft 80. This connection prevents these shafts from flexing toward each other under heavy load conditions. As a result, I have found that the drive chain breakage, heretofore involved in driving the upper conveyor, has been substantially reduced. Apparently, when these shafts flex toward each other, the distribution of the load on the going run of the conveyor links is changed, since the links on one side of the going run are necessarily slackened while those on the other side are tightened. The load necessarily

shifts in a corresponding degree from the slackened side of the going run to the tightened side thereof thereby overloading the links on the tightened side and ultimately causing them to break. The upper link 77, of the elbow linkage, prevents this flexure. It is, therefore, made adjustable to insure that the radius rod connection between the two shafts involved will remain tight. In further accordance with my invention, the lower drive is provided with an adjustable radius rod connection 82 between motorized drive shaft 70 and the lower conveyor drive shaft 72.

OPERATION

In operation, the machine is vertically adjusted to a desired mattress thickness, transversely adjusted to a desired mattress width and, when these adjustments have been completed, the mattress casing is telescopically drawn over the spout section until its closed end is adjacent the front end thereof. The receiving section is filled with filling material and the conveyors operated to convey that material forwardly successively through the compressing and spout sections. In the compressing section, the filling is not only compressed vertically but, to a slight extent, transversely. At the front end of the spout section, the filling material initially engages the closed end of the mattress casing, and, as operation of the machine continues, it progressively fills the mattress and simultaneously moves it forwardly so that it will become free of the machine when the filling operation is completed.

It will be appreciated: that the vertical thickness and transverse width adjustments can be easily, quickly and accurately made; that the machine presents no obstructions around its rear corners which interfere with the movement of the workers in that area; that each drive sprocket, being located on the outer side of each bar, will tension its conveyor chain from the rear or chain tensioning sprocket forwardly throughout the conveying run of the machine and rearwardly to the drive sprocket, the only slack in the chain being from the drive sprocket back to the tensioning sprocket; that, as a consequence of the use of the holding means with the conveying run under tension, the conveying run of each chain will hug its bar throughout the length thereof; that each tensioning means is readily accessible for operation and easy to operate; and that stable operation is achieved as a result of the use of the extra equispacers and the radius rods which are associated with the drive means.

Having described my invention, I claim:

1. A mattress filling machine comprising: a lower frame; an upper frame; and means adjustably supporting the upper frame upon the lower frame for relative vertical up and down movement, said means including upright guides on the lower frame, vertical legs on the upper frame depending downwardly into vertically slidable leg-retaining engagement with the upright guides and eccentric means on the lower frame connected to the legs for adjustably moving them along the guides.

2. The machine of claim 1 wherein: the guides and legs have telescopic engagement with each other; and said eccentric means includes a crank arm connected to the legs through a linkage which reciprocates the legs upwardly and downwardly during each revolution of the crank arm.

3. A bar and sprocket chain assembly for a mattress filling machine of the type which extends forwardly from a rear end receiving section through a compressing section to a front end spout section where it delivers the filling material in a compressed condition into the interior of a mattress casing, comprising: an elongate bar having, between its rear and front ends, at least two sections corresponding to compressing and front end spout sections, which are cooperatively arranged to form the sides of an outer obtuse angle positioned on the outer side of the bar; a sprocket chain supported on said bar for longitudinal conveying movement along the inner side of said bar and return movement on the outer side of the bar; and a chain engaging sprocket positioned along the outer side of the bar and mounted thereon.

4. The assembly of claim 3 wherein: a pair of chain engaging sprockets, including a drive sprocket, is mounted on said bar at the apex of said obtuse angle.

5. The assembly of claim 3 including: means adjustably mounted on the rear end of said bar for adjusting chain tension, said means including a sprocket around which the rear end of said chain extends.

6. The assembly of claim 5 wherein: said adjusting means includes a block slidably mounted on said bar, said block rotationally supporting said rear end sprocket; and an adjusting screw adjustably connecting said block to said bar and operative, when rotated in one direction, to move said block and rear end sprocket longitudinally relatively to said bar.

7. The assembly of claim 3 wherein: said bar has a third section, which corresponds to a receiving section and which cooperates with the compressing section to form the sides of an obtuse angle on the inner side of the bar; and holding means is provided on the bar to hold the chain in snug engagement with the receiving and compressing sections.

8. The assembly of claim 7 wherein: said bar has a chain receiving slot at the apex of said inner obtuse angle; and said chain holding means is associated with said slot in a manner compelling said chain to enter the slot near the end of the receiving section and to leave the slot near the beginning of the compressing section.

9. The assembly of claim 8 wherein: said holding means includes a roller mounted on the bar, adjacent said slot; and said sprocket chain extends around the outer side of the roller which corresponds to the outer side of the bar.

10. The assembly of claim 7 wherein: a pair of chain engaging sprockets, including a drive sprocket, is mounted on said bar at said obtuse angle.

11. The assembly of claim 7 including: means adjustably mounted on the rear end of said bar for adjusting chain tension, said means including a sprocket around which the rear end of said chain extends.

12. The assembly of claim 11 wherein: a pair of chain engaging sprockets, including a drive sprocket, is mounted on said bar at said obtuse angle.

13. The transversely expandible and retractable conveyor unit for a mattress filling machine of the type which extends forwardly from a rear end receiving section through a compressing section to a front end spout section where it delivers the filling material in a compressed condition into the interior of a mattress casing, comprising: a conveyor-forming group of longitudinally-extending transversely-spaced bar and sprocket chain assemblies; and means interconnecting said bars for stabilizing purposes and for coordinated transverse adjusting movement relative to each other between fully retracted and fully expanded positions, said means including at least three transversely-extending bar-interconnecting lazytong equispacers, at least two of said equispacers being longitudinally-spaced, the transverse plane of at least one equispacer forming with a horizontal reference plane an angle which is substantially different from the angle which either of the other two equispacers forms with the same reference plane.

14. The conveyor unit of claim 13 wherein: the transverse planes of two of said equispacers intersect to form an angle appoximating a right angle.

15. A mattress filling machine comprising: a lower frame; a group of lower elongate bar and sprocket chain assemblies, each having at least one sprocket chain supported on its bar for longitudinal conveying movement along the upper or inner side of its bar, the bars of said group extending longitudinally in parallel transversely-spaced relationship; lazytong equispacers interconnecting the bars of said group into a longitudinally-extend-

ing transversely expansible-retractable conveyor; means mounting said conveyor to extend longitudinally upon said lower frame for longitudinal rear to front conveying movement, said mounting means anchoring one bar rigidly to the frame and supporting the other bars, on one side of the anchor bar, slidably upon the frame for transverse adjustment; and means operable, when actuated, for adjusting said bars transversely to widen and narrow said conveyor, said means including an adjusting member extending transversely of the bars with one end anchored on one of the transversely movable bars for inward and outward transverse movement therewith and a cooperative mechanism engaging said transverse adjusting member between its ends and being operative, when actuated in one direction, to move said adjusting member transversely in one direction.

16. The machine of claim 15 wherein: said adjusting member is in the form of a transverse adjusting screw; and said cooperative mechanism comprises a relatively rotatable means threaded on the screw to pull the screw inwardly and push it outwardly respectively upon relative rotational movement in one direction and the other.

17. The machine of claim 15 wherein: the rear end of said machine widens and narrows transversely with the expansion and retraction of said conveyor; and the rear end of said machine and of said transverse adjusting member transversely overhang a side of the lower frame at its rear end in a manner progressively increasing and decreasing as the rear end of the machine widens and narrows.

18. A chain sprocket drive for mattress filling and other machines, comprising: one frame; a first power transmitting assembly, including a first sprocket shaft mounted on said one frame at a relatively fixed location and a first sprocket mounted thereon for rotation when driven; a second power transmitting assembly including a second sprocket shaft and a second sprocket mounted thereon for rotation when driven; means interconnecting said first and second sprockets so that rotation of one will rotate the other; and a first relatively rigid radius rod extending between the first and second power transmitting assemblies and connected to both of said first and second sprocket shafts to prevent the movement of either sprocket shaft relatively toward the other.

19. The drive of claim 18 including: another relatively movable frame; a third shaft rotatably mounted on said other frame at a relatively fixed location; a relatively rigid second radius rod extending between the second and third shafts and connected to each for pivotal movement about at least one of their respective axes; and a pair of intermeshing gears interconnecting said second and third shafts respectively.

20. The drive of claim 19: including means to support said one frame on, and to raise and lower it relatively to, said other frame to adjust the vertical spacing therebetween; and wherein said first and second radius rods constitute an elbow linkage, which accommodates said vertical adjusting movement between said frames, by causing the gear on the second sprocket shaft to travel around the periphery of the gear on the third shaft to an extent proportional to the degree of relative movement and in a direction corresponding to that relative movement while maintaining said intermeshing gear connection between the third and second shafts.

21. A mattress filling machine of the type which extends forwardly from a rear end receiving section through a compressing section to a front end spout section where it delivers the filling material in a compressed condition into the interior of a mattress casing, comprising: a lower frame; a lower conveyor mounted on the lower frame to extend continuously from the rear end thereof successively through the receiving, compressing and spout sections of the machine to the front end thereof; an upper frame; an upper conveyor mounted on the upper frame to extend continuously from its rear end successively through the compressing and spout sections of the machine to the front end thereof, said conveyors being vertically spread apart; each conveyor being composed of a single group of elongate longitudinally-extending transversely-spaced bar and sprocket chain assemblies; and means adjustably supporting the upper frame upon the lower frame for relative vertical up and down movement therebetween to vary the vertical spacing between said conveyors.

22. The machine of claim 21 wherein each elongate assembly comprises: a group of longitudinally-extending transversely-spaced elongate bars, each bar having compressing and front end spout sections cooperately arranged to form the sides of an outer obtuse angle which is positioned on the outer side of the bar; a sprocket chain supported on said bar for longitudinal conveying movement along the inner side of the bar and return movement on the outer side thereof; and a chain engaging sprocket positioned on the outer side of the bar and mounted thereon at said obtuse angle.

23. The machine of claim 22 wherein: said bar for the lower conveyor has a third section corresponding to the receiving section and cooperatively arranged with the compressing section to form the sides of an inner obtuse angle which is positioned on the inner side of the bar.

References Cited in the file of this patent

UNITED STATES PATENTS

Re. 21,319	Tornberg	Jan. 9, 1940
2,110,359	Droll et al.	Mar. 8, 1938
2,146,963	Lang	Feb. 14, 1939
2,673,673	Kibitz et al.	Mar. 30, 1954